R E P O R T R E S U M E S

ED 019 524 VT 005 726

FORD FOUNDATION GRANTS IN VOCATIONAL EDUCATION.
FORD FOUNDATION, NEW YORK, N.Y.

PUB DATE 67

EDRS PRICE MF-$0.25 HC-$1.52 36P.

DESCRIPTORS- *VOCATIONAL EDUCATION, *TECHNICAL EDUCATION, PILOT PROJECTS, RESEARCH PROJECTS, *CURRICULUM RESEARCH, TEACHER EDUCATION, WORK STUDY PROGRAMS, COLLEGES, HIGH SCHOOLS, POST SECONDARY EDUCATION, ADULT EDUCATION, DROPOUT PREVENTION, INDUSTRIAL ARTS, VOCATIONAL EDUCATION TEACHERS, *FOUNDATION PROGRAMS, *GRANTS, GRAPHIC ARTS,

IN ASSISTING EFFORTS TOWARD QUALITY VOCATIONAL AND TECHNICAL EDUCATION, THE FORD FOUNDATION HAS MADE GRANTS TO EDUCATIONAL INSTITUTIONS AND RESEARCH ORGANIZATIONS WITH THE VIEW THAT VOCATIONAL EDUCATION IS AN INTEGRAL PART OF EDUCATION, PARTICULARLY AT ALL LEVELS OF SECONDARY AND POST-SECONDARY EDUCATION, AND THAT IMPROVEMENT OF VOCATIONAL AND TECHNICAL EDUCATION IS THE RESPONSIBILITY OF ALL EDUCATORS, ACADEMIC AND GENERAL AS WELL AS VOCATIONAL. DESCRIPTIONS OF PILOT PROGRAMS AND EXPERIMENTS INCLUDE (1) NINE IN CURRICULUM IMPROVEMENT, (2) FOUR IN RESEARCH, DEVELOPMENT, AND INFORMATION, (3) FOUR IN VOCATIONAL-TECHNICAL TEACHER TRAINING, AND (4) 13 IN COOPERATIVE WORK-STUDY EDUCATION. REPRESENTATIVE EXAMPLES INCLUDE--(1) A PROGRAM TO DETERMINE WHICH APPROACH IN VOCATIONAL EDUCATION WORKS BEST IN MOTIVATING RECENT DROPOUTS TO FINISH HIGH SCHOOL, (2) A PROGRAM TO DEVELOP TRULY COMPREHENSIVE SECONDARY SCHOOLS THAT OFFER VOCATIONAL AND TECHNICAL SUBJECTS AS ELECTIVES IN THE SAME WAY AS ACADEMIC SUBJECTS, (3) THE ESTABLISHMENT OF A CURRICULUM CENTER TO CONCENTRATE ON CONTINUING RESEARCH DESIGNED TO IMPROVE AND UPDATE ENGINEERING TECHNOLOGICAL EDUCATION, AND (4) A 4-YEAR PROGRAM DESIGNED TO PREPARE ACADEMIC AND TECHNICAL TEACHERS FOR 2-YEAR PROGRAMS AT JUNIOR COLLEGES, COMMUNITY COLLEGES, TECHNICAL INSTITUTES, AND SIMILAR INSTITUTIONS. THIS DOCUMENT IS AVAILABLE FROM FORD FOUNDATION, OFFICE OF REPORTS, 477 MADISON AVENUE, NEW YORK, NEW YORK 10022. (PS)

ED019524

Ford Foundation Grants in Vocational Education

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Library of Congress Catalog Card Number 65-26926.
Revised July 1967. Second printing.

Additional copies may be obtained by writing the Ford Foundation, Office of Reports, 477 Madison Avenue, New York, N.Y. 10022.
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Change in Vocational and Technical Education

In 1963 the Ford Foundation initiated an effort to help improve vocational and technical education in the United States. The program is designed to assist and encourage improved means of preparing American youth for productive jobs in a rapidly changing labor market and motivating them to greater educational accomplishment. In announcing it, the Foundation said:

"Vocational education has been the stepchild of the American education system since it was introduced at the turn of the century. Traditionally, schools have been in a better position to prepare students for college than for vocations. This is partly because business, industry, and formal education have not been able to reach a clear understanding of their respective roles in fitting modern youth for the modern labor market. Now, as the pace of technological change is constantly quickening, the demand for special knowledge and skills is mounting. At the same time, more young people are unemployed because they are unskilled, or because they have the wrong skills for the new age. A rational, effective system of vocational education is needed."

Working with groups already active or interested in the field of vocational education and with others in education and industry, the Foundation assists promising experiments and pilot programs with potential for application throughout the country. As in other Foundation programs, support is not normally given for purely local needs, the routine operating costs of institutions, or building projects.

Not since World War II, when rapid, effective technical training for the armed forces and for wartime industry was a matter of national survival, has interest in vocational and technical training been so intense as it is today.

Technological changes, which are intrinsic to an industrial society, have been unprecedented in scope and rapidity. Some occupations of long standing have been reduced, if not wiped out (the vanishing elevator operator comes readily to mind). New occupations, calling potentially for tens of thousands of employees (computer technicians, for example), have arisen in less than a decade.

The nature of the labor force has changed dramatically, too. Young people are increasing in numbers three times as fast as the population as a whole. The labor force, which now stands at 72 million, will increase by 1970 by 13.5 million, of whom *nearly half* will be between the ages of sixteen and twenty-four. As a result, employers will have an abnormally large pool of new workers from which to draw, and they will seek only the well-trained applicants.

The pattern of a lifetime in a single occupation is less and less the lot of the average employee. Workers are not only moving about the country more than ever; in one recent year nearly eight million of them changed to a completely different industry, nearly three-fourths to a completely different occupational category.

Finally, great changes are under way in the employment fields where the greatest opportunities exist. Despite continuing hard-core unemployment, jobs remain unfilled in semi-professional technical areas (medical technicians, for example, or aides in child day-care centers) and in such occupations as food preparation, teaching, and retailing. Most new jobs for a rapidly expanding population have opened up not only in private industrial plants but in service industries and in government work.

Against these conditions, the following problems emerge:

– Too often vocational education today limits the range of opportunities and career choices for young people. Students are not often enough trained in general work skills that are transferable from one occupation to another. Instructional programs for career fields need to be developed – medical technology, graphic arts, and subprofessional business occupations, for example – to replace curricula aimed at preparation for a narrow range of occupations.

– Research in vocational and technical education leading to more relevant curricula – an inquiry to identify transferable skills, for example – is insufficient. Except for isolated research in university schools of agriculture, engineering, and education, universities have not applied the full range of their scholarly resources to the field.

– Experimentation and demonstration efforts are needed to determine the best means of training thousands of vocational-education teachers for secondary schools, technical institutions, and community colleges.

– Vocational education is for all practical purposes a separate system operating parallel to the general system from about the ninth grade on. Thus it requires the duplication of administrative and instructional facilities and activities which might, if it were integrated with the general system, be shared.

– A dual system of education is not only generally wasteful; it also restricts educational opportunity. In most vocational programs, youngsters must decide whether to get on a vocational track – and decide which vocational track – by the ninth grade, an age when they have not had sufficient opportunity to determine their real interests and aptitudes. At the same time, because the vocational system is a separate one into which some youngsters are shunted at a particular time and level of development, they have little idea of what it may offer them and less opportunity to test it before they are committed. Its content is such that most vocational students are

cut off from the academic training necessary to qualify for college. Moreover, even if a student does not go to college, much of today's world of work demands richer general education than most traditional vocational programs offer.

— On the other hand, a pupil in a college-preparatory program should have the opportunity for experience in vocational training. Even if he continues to pursue a college career, he will have had an exposure to the world of work, which is a necessary part of liberal education in a scientific-technological society. Most important, vocational and general education have characteristics that naturally reinforce each other and maintenance of separate systems prevents this interaction.

These shortcomings and needs are beginning to engage the active concern and effort of educators, industry, and public officials. The concern is heightened by a desire to apply burgeoning Federal aid to vocational education to best effect.*

*Substantial Federal assistance for vocational education began in 1917 after years of pressure by business and labor. The Smith-Hughes Act reflected a belief that neither apprenticeship nor the regular public-school system was providing adequate training for industry. Between 1917 and the end of World War II, Smith-Hughes appropriations, including subsequent amendment acts, totaled $302,962,697. The states were required to match the Federal funds dollar for dollar. The funds were for salaries of teachers and supervisors of trade, industrial, and agricultural subjects and for the training of teachers. (A variety of vocational training was supported under various New Deal programs as well, but these bypassed the regular school system almost entirely.) Annual Federal vocational-education authorizations were increased in 1946 and 1956, bringing the annual authorization to $39 million.

More recently, Federal assistance rose to a new order of magnitude with a series of laws beginning with the National Defense Education Act in 1958 and culminating with the Vocational Act of 1963 and various antipoverty acts in 1963 and 1964, all of which brought the total Federal appropriations for aid to vocational education to more than $1 billion in 1966, including in-school training and other forms of training. However, most Federal assistance consists either of emergency short-range measures or support for vocational training outside the regular educational system.

In its assistance to efforts toward quality vocational and technical education, the Ford Foundation has made grants to elementary and secondary schools, technical institutes, community colleges, research organizations, universities, and teacher-training institutions – all with the view "that vocational education is an integral part of education, particularly at all levels of secondary and post-secondary education . . . and that improvement of vocational and technical education is the responsibility of all educators, academic and general as well as vocational."*

Toward System-Wide Change

The Foundation believes that the experiments and demonstrations described below contain elements that can strengthen most educational programs. Yet to be explored is their potential if applied in a coordinated, systematic way through the entire educational sequence. In such a system, more students of more diverse abilities might advance further, learn more, and achieve a higher realization of their potential than under conventional programs.

Such a system would introduce awareness of the relationships which exist between schooling and work – how man supports himself through work, how various occupations use knowledge – beginning in the elementary grades. It would use tools, materials, and activities until now principally associated with vocational education to provide concrete, nonverbal complements to the generally abstract-verbal performance standards of conventional education, and as a vehicle to show various kinds of knowledge and concepts in action settings. It would also promote respect for varying individual talents and capabilities.

*Edward J. Meade, Jr., program officer in charge of Public Education, Ford Foundation, "The Ford Foundation's Interest in Vocational and Technical Education," *Phi Delta Kappan*, Vol. XLVI, No. VIII, April, 1965.

In the middle school years, more intensive consideration of the relationships among school work, individual abilities, and the opportunities and demands of various career fields would provide awareness of how options in later life may be expanded or limited by performance and choice. From this period on, each student might have a personal inventory of interests, abilities, and achievement designed to keep before him a full picture of the paths open to him, and subject to continual revision in the light of his further progress and development.

In junior and senior high school, the coordinated curriculum approach embodied in several of these projects (see the Cogswell Polytechnical College program, for example) would be employed to lend reality and a sense of purpose to education for all students, including the college-bound; and to equip those not planning on college with marketable skills without foreclosing the prospect of continuing education after high school. A major purpose would be to eliminate the so-called "general"* curriculum which neither prepares students for useful work upon graduation, nor equips them adequately for further education. Another would be to refocus purely vocational content toward more generally useful skills and concepts in line with the emerging shape of the job market.

At the post-secondary level, career preparation would continue but curricula would be designed also to enable students to advance to four-year college and university courses.

The Foundation believes that such a program, properly designed and implemented, could offer richer content for the intellectually inclined, stimulation for the able but indifferent, and new doors to greater achievement for those whose abilities do not find expression in conventional classroom exercises. In short, it could make education even more effective, humane, and socially productive than it is today.

*Not to be confused with general education at the college level.

Grants

There is some overlap among the following categories. For example, while the program at San Francisco State College aims mainly at preparing teachers for school systems adopting programs similar to that developed by the Cogswell Polytechnical College for the San Francisco Bay Area public schools, it also includes further curriculum experiments and preparation of instructional materials.

Furthermore, other Foundation activities have facets relevant to vocational education. A comprehensive school-improvement grant for the Pittsburgh Public Schools, for example, includes revision of traditional occupational, vocational, and technical education programs designed to raise their quality and their prestige among students and the public.

As noted, some of these grants were made by the Fund for the Advancement of Education, an independent organization established by the Ford Foundation in 1951. The Fund concluded its program in 1967.

Improvement of Curricula

1. Cogswell Polytechnical College ($185,000) (1963)
Project Director:
Garrison B. Smith, Cogswell Polytechnical College
3000 Folsom Street, San Francisco, California 94110

The Foundation grant supported refinement, testing, and expansion of the "Richmond Plan," an experimental pretechnology curriculum devised in 1962 by Cogswell Polytechnical College (a two-year technical institute) for students in the last two years of high school. The program seeks to employ the academic (general) high school for effective vocational education. It began in two Richmond, California, comprehensive high schools under a grant from the Rosenberg

Foundation. The Ford Foundation assisted its adaptation by ten other Bay Area high schools over a three-year period. In addition, two public junior colleges were assisted in revising their programs to serve pretechnology students after high school. Teacher-training activities and other services required to assist additional schools to adopt the program are now supported at San Francisco State College (see page 22).

The program is designed for students who are not challenged by college preparatory courses even though they have the capability of succeeding in them. Built around the vocational interest of the student, it also seeks to stimulate him to continue education in a junior college, in a technical-institute technology program, or at a four-year college. Past academic performance is not a criterion for participation. The participants have mechanical aptitude but range widely in intelligence. Many, in fact, were poor students and some had been identified as potential dropouts.

The program seeks to dovetail technical and academic subjects along the lines of natural relationships, to use a shop program to dramatize the relation between theory and practice, and to apply such new techniques as team teaching and programmed instruction.

The program consists of five major courses in the eleventh and twelfth grades – English, physics (one and one-half years), chemistry (half a year), mathematics through trigonometry, and technical laboratory (an integrated shop course including drafting). Students take these subjects as a group, but mix with other pupils in the high school for the other courses normally given in the eleventh and twelfth grades (history, social studies, physical education).

As an example of how the subjects are coordinated to reinforce each other, the study of heat taught in the physics class (through the first law of thermodynamics) is related in mathematics instruction to first-degree equations (necessary for linear expansion), supported in the laboratory by the construction of apparatus with which to con-

duct heat experiments, and is followed in English class by oral and written reports on the subject.

Teachers report that students who had not previously done well in school have become hard-working, highly motivated, and interested in their academic as well as technical subjects. Most of them are expected to go on to two-year post-high-school technological programs, and to qualify eventually for careers as high-quality engineering technicians or even as engineers.

2. Oklahoma State University (Research Foundation)
($185,000) (1963)

Project Director:
Victor O. Hornbostel, Department of Education
Oklahoma State University, Stillwater, Oklahoma 74075

The Oklahoma City Public Schools began a study in 1963 to determine which approach in vocational education works best in motivating recent dropouts to finish high school. City and state agencies have financed the instructional costs of the program. The Ford Foundation grant is for comparative testing of experimental programs which offered unemployed dropouts, between the ages of nineteen and twenty-two, a chance to fulfill minimum requirements for a high-school diploma and to learn a marketable skill. To enable the returned dropouts to finish high school and prepare for employment, improved methods and courses included individualized and non-graded instruction in vocational as well as academic subjects.

Three programs have been tested: One group of 100 trainees was given both vocational and academic instruction. A second group of 100 trainees received vocational instruction only. A third group of fifty had only academic studies. A general control group of 100 dropouts was identified to determine the job paths taken by dropouts who are given no additional education (although a few may be

expected to return to school on their own initiative). Studies of differences in motivation and vocational and academic achievement among the first three groups were made in the course of training. For two additional years, studies are being made of variations in job placement and job success among all four groups. The analysis is scheduled for completion in 1968.

Like many other Foundation-supported programs, the Oklahoma City experiment engages a variety of agencies in addition to the public schools. The Oklahoma Employment Security Commission surveyed the labor market to identify jobs for which the students are trained, tested prospective participants, and paid training stipends to 200 trainees for fifty-two weeks. The Oklahoma State Board for Vocational Education, using Federal funds, was responsible for vocational instruction and provided professional staff, instructional materials and equipment, and facilities.

3. Stout State University ($65,000) (1964)
Project Director:
Wesley Face, Stout State University
Menomonie, Wisconsin 54751

In cooperation with ten neighboring secondary schools in Wisconsin and Minnesota, Stout State University conducted a one-year experiment in industrial-arts education with Foundation aid, and now has obtained a Federal grant to continue the program.

Dissatisfaction with present industrial-arts programs arises from the belief of many educators and representatives of industry that the schools devote too little effort to concepts and basic understanding that equip students for a lifetime of learning and advancement in industry.

The premise of the Stout experiment, therefore, is that students will benefit more from an understanding of the major concepts and

processes of American industry and technology than from a series of manual activities unrelated to each other. Thus the new curriculum focuses on the concepts of industrial management, production, and service and on processes (e.g. cutting, finishing, forming, fastening) associated with changing the form of industrial materials. Instead of building book-ends or repairing motors, for example, students engage in manufacturing processes and relate their work to problems of management, production, and service.

The curriculum also includes general-education elements imparting an understanding of economics, marketing, distribution, personnel, and related facets of industry.

Beginning with an eight-week workshop on the new program in the summer of 1964 for teachers from nearby junior and senior high schools, the program has been tested in various schools in units ranging from three weeks to the full school year. The variations were designed to explore the use of the new curriculum as an alternative to current industrial-arts programs, a replacement for parts of traditional programs, and as an elective for college-bound students. Additional funds from the U.S. Office of Education are financing further curriculum refinement, development of materials, teacher training, and consultant services.

4. City College of San Francisco (Hotel and Restaurant Foundation) ($75,000) (1964)

Project Director:
Louis F. Batmale, City College of San Francisco
Ocean and Phelan Avenues, San Francisco, California 94112

The City College of San Francisco has adopted the Richmond Plan's coordinated approach to prepare students not motivated by traditional high-school programs for careers in hotels and restaurants.

The field offers special opportunities because it is expanding and because it offers a wide range of jobs, from cook or cashier to manager or salesman.

Starting with a Foundation grant, since supplemented by state funds, the college conducts annual two-week summer workshops for teachers from schools in the program (fifteen are now involved, ranging from heavily Negro, urban comprehensive schools to middle-class suburban schools). Workshops are attended by home-economics, business, mathematics, and English teachers and counselors and cafeteria managers. Training includes planning, costing, purchasing, food preparation, baking, and cafeteria and dining-room operation. Participants made field trips to hotels and restaurants.

The program at the schools is conducted in the eleventh and twelfth grades. Together with the counselor, the home-economics, business, and English teachers form a team responsible for instructing students in basic education (science, mathematics, and English) and the principles of food preparation and service. This includes quantity food preparation; purchasing, storage, and control of supplies and equipment; and application of their course work in business practice and English. The course also includes practical work in the schools' cafeterias and faculty dining rooms, where students serve as hostesses and managers, cooks, and waiters.

On completion of their high-school courses, students become eligible for more specialized training in the food-services classes at City College of San Francisco and Oakland City College, or in similar programs in other community colleges. Other students may elect hotel and restaurant management programs at four-year colleges. Those wishing to go to work immediately will have an adequate background for success in on-the-job training programs in local hotels and restaurants. Labor and management representatives, who serve on the program's advisory board, also help place students in suitable positions.

5. Western Washington State College ($490,000) (1965)

Project Director:

Ray A. Schwalm, Western Washington State College
Bellingham, Washington 98225

Western Washington State College, with a Foundation grant, is developing a comprehensive curriculum in the graphic arts. Ranging from the secondary school through the community college level, the curriculum is expected to provide basic training to enable technicians to work in printing, photography, commercial art, advertising, television production, packaging, internal corporate publishing, visual aid production, and cartography. The new curriculum will be tested in more than a dozen secondary schools across the nation and in British Columbia, beginning in the fall of 1967. It will include a two-year program stressing the science and technology of visual communications to be given in grades eleven and twelve for students planning to attend a technical institute, and a special twelfth-grade program will be for students planning to enter industry after high school.

The college will offer a training program for future teachers of these courses, to be taught by college faculty in economics, psychology, sociology, anthropology, mathematics, chemistry, and industrial arts. Teachers and administrators will join college officials in a summer workshop and other activities to refine the curriculum designed for use in secondary schools.

At the community college level, the curriculum – to be tested by community colleges in Seattle and Vancouver – will prepare students for technicians' jobs in such fields as advertising, photography, commercial art, and printing. Western Washington State will itself conduct a two-year technology program for graduates of participating high schools who are unable to attend a community college with a program suited to their needs.

6. Newton Public School System ($430,000) (1964)

Project Director:

J. Wallace Fletcher, Newton Public Schools
430 Walnut Street, Newton, Massachusetts 02160

The Newton public-school system, a national showcase for experimental efforts to improve academic excellence, has begun an effort to end the traditional separation of vocational and academic high-school studies. Assisted by a Foundation grant, Newton is attempting to develop truly comprehensive secondary schools that offer vocational and technical subjects as electives in the same way as academic subjects. Thus they may be taken by all students. Conversely, vocationally oriented students will be permitted and encouraged to take academic subjects in order to broaden their educational background.

In adopting the new plan, Newton is gradually abandoning the operation of a separate vocational high school, in which only 200 of the city's 4,300 high-school students were enrolled. Newton school officials believe the low enrollment was due to the fact that parents regarded a separate vocational school as low in status. Hence the Newton program is an effort to give equal status to vocational and academic studies. Vocational courses are also being revised to provide more broadly transferable skills and maintain a maximum range of career options for each student.

7. Board of Education of the City of New York ($500,000) (1966)

Project Director:

Morton H. Lewittes, Board of Education of the City of New York
480 Pacific Street, Brooklyn, New York 11217

The New York program is using the Richmond Plan approach to develop a pre-occupational program in business, industrial, and

health technology fields in which there are extensive job opportunities. If successful, this will eventually replace the "general" course now offered to secondary-school students who are not college-bound and do not qualify for a New York vocational school program. In this respect it differs from the Cogswell project, where the new curriculum replaced a college preparatory course.

Curricula are being developed by teams of academic teachers, technical-vocational teachers, and consultants for ninth- and tenth-grade exploratory courses and eleventh- and twelfth-grade pre-occupational programs. The courses, designed to relate academic subject-matter content to shop or laboratory work, offer both training in identifiable skills for students who must find employment at the end of twelfth grade, and the basic academic education necessary for those who will continue in training beyond high school. Teachers of the exploratory courses are given special training in workshops.

During the 1966-67 academic year the program is being offered in five schools. If the initial year is promising, the program will be extended to twelve schools in 1967-68, and to all new comprehensive schools (grades 9-12) by 1970.

8. New Jersey State Department of Education
($166,000) (1966)

Project Director:
Miss Elizabeth E. Hunt, State Supervisor of Industrial Arts K-6
State Department of Education
225 West State Street, Trenton, New Jersey 08625

The New Jersey State Division of Vocational Education is preparing elementary-school teachers in methods of relating the curriculum to the world of work, in a pioneering two-year effort to adapt to the elementary-school level the lessons of the Richmond Plan.

On the whole, elementary schools continue to use an academic

approach which does not exploit the technical interests and concrete experiences of children whose homes do not provide strong verbal or intellectual orientation. Accordingly, the project attempts to demonstrate that elementary schools can provide alternative experiences for pupils who do not respond to conventional teaching processes. Appropriate activities involving work with tools and materials have been identified, and specific ways of using these activities to support language development, mathematics, and the physical and social sciences have been developed in a preliminary summer institute for teachers. Additional teachers are being trained to apply these processes, which will be tested and refined in nine elementary schools. The State Department of Education and several New Jersey teacher training institutions are cooperating in developing this program.

If successful, the findings of the project will be incorporated in future elementary teacher preparation programs at Trenton State College, Glassboro State College, Jersey City State College, and Rutgers Graduate School of Education.

9. New York Institute of Technology ($334,000) (1966)
Project Director:
Alexander Schure, President, New York Institute of Technology
Old Westbury, New York 11568

The New York Institute, which has pioneered in the development of programmed and computerized courses of instruction, is now testing the feasibility of using computers in guidance and evaluation, to assist in developing individually tailored programs for students who are attracted to technical and sub-professional careers but do not appear likely to succeed in conventional training programs.

During the two experimental years, the institute is admitting 500 students who would not qualify for a regular institute program. This experimental group is interviewed and tested and the data are

sent to a computerized information center which prepares a comprehensive profile of ability, skills, and knowledge for each student and predicts his future performance. On the basis of the predictions, profiles, and interviews, guidance staff designs an individual program for each student.

Students whose profiles indicate immediate capability for college work are enrolled in specially planned programs leading to the four-year bachelor's or two-year associate degree in various technical fields.

The others are referred to a diagnostic center for further testing. On the basis of their test scores, they are either placed in a two- or four-year program which combines regular courses with remedial studies to overcome academic weaknesses, or enrolled in an intensive pre-college program designed to help them overcome marked deficiencies before undertaking college-level courses. If found unable to undertake college-level work, they are placed in an "alternate skills" program which combines jobs in cooperating industrial organizations with off-campus studies and holds open the possibility of later shifting to a college-level program.

A major feature of the program is a continuous assessment of each student's progress (test scores, rate of learning, and skills acquired, for example) – not only at the end of courses or semesters – that is fed back to the staff. This enables the staff to check and refine their predictive techniques and also to modify students' curricula. For example, a student's performance in a work-study program might indicate later readiness for college admission and more advanced training. Alternatively, a student whose performance indicates poor chances of success in a given career goal can be redirected to one he is capable of achieving.

While the program maintains face-to-face counseling, it is also attempting to demonstrate that computers can keep guidance and evaluation staff requirements for a diverse group of students within economically feasible bounds.

Research, Development, and Information

1. American Institute for Research ($447,000) (1963)
Project Director:
Robert M. Gagné, American Institute for Research
410 Amberson Avenue, Pittsburgh, Pennsylvania 15232

The American Institute for Research, a nonprofit institution that conducts basic and applied research in the behavioral sciences, received Foundation support to evaluate the relevance of programs in vocational and technical schools to current technological needs and also to identify general and transferable work skills.

In the first study, the institute analyzed the employment histories of some 5,400 graduates of vocational programs during the last ten years, as well as the histories of about 1,800 other high-school graduates, employed in similar jobs, who did not take vocational programs.

Concentrating on the major skills taught in vocational high schools, the study seeks to clarify where and how people acquire skills, the relevance of vocational and technical education to employment, and the kinds of vocational training that have the best payoff.

While the results tend to confirm a number of reasonable assumptions about vocational education – earlier employment, greater job security, higher accumulated earnings than academic graduates without further education, for example – they also turn up some new insights. For one thing, only half of the vocational graduates enter trades for which they were trained or highly related occupations. For another, they display little difference from academic graduates without a college education with respect to conversational interests, leisure activities, community affiliations – thus contradicting the contention that they are less well-educated from the standpoint of the "whole person" than academic graduates.

In the second study, the institute analyzed a spectrum of occu-

pations to identify general and transferable work skills common to many jobs – for example, ability to make rough sketches of spatial arrangements, or knowledge of safety procedures – in contrast with skills particular to each job. Both reports have been published by A.I.R.'s Institute of Performance Technology.

2. University of Wisconsin ($820,000) (1964)
Project Directors:
Gerald Sommers and J. Kenneth Little,
Center for Research and Development of Vocational-Technical Education and Training
University of Wisconsin, Madison, Wisconsin 53706

Wisconsin was the first major university to give high priority to the study of vocational and technical education. Its center for research in the field, supported by the Foundation over a five-year period, is under the co-direction of a professor of educational psychology and a professor of economics.

Since the beginning of operations in the fall of 1964, the center has concentrated on establishing a clearinghouse of information basic to the strengthening of vocational and technical education – reports, curricular materials, and information on research and experimental projects under way. The center publishes *The Journal of Human Resources*, reporting research in the vocational and technical fields, and holds several research conferences a year on current problems in the field.

The center's research is conducted by experts in many fields – including economists, sociologists, psychologists, curriculum specialists, counseling experts, and specialists in the vocational-technical aspects of agriculture, commerce, engineering, home economics, and the industrial arts. It focuses on such topics as occupational trends and the job market; relation of job needs to training programs;

vocational-education programs' demands on aptitudes, skills, and knowledge; problems of disadvantaged groups; curriculum planning; counseling and work-study programs; development of instructional materials; training of teachers; and on-the-job training.

3. W. E. Upjohn Institute for Employment Research†
($65,000) (1965)

Project Director:
Herbert Striner, W. E. Upjohn Institute for Employment Research
1101 17th Street, N.W., Washington, D.C. 20036

Under the requirements of Federal vocational-education legislation, tens of thousands of businessmen, labor officials, and industrial representatives serve on an estimated 11,000 industrial advisory committees throughout the country. Many trades and crafts have established their own committees to advise school systems on aspects of vocational education ranging from curriculum and training equipment to teacher selection and qualifications.

Yet no systematic study of industrial advisory committees has been made in the half century they have been active, and little is known about their actual effectiveness, methods of operation, and composition. To gather this information and to clarify the basis of effectiveness of the committees, the Fund for the Advancement of Education made a grant for a one-year study by the W. E. Upjohn Institute for Employment Research. The institute is a division of the W. E. Upjohn Unemployment Trustee Corporation, a private, nonprofit agency set up in 1945 by the Michigan drug manufacturer.

The study examines the advisory committees' influence on vocational-education curriculum planning; their role in keeping teachers informed about changes and trends in the fields in which they teach; the selection of students for job placement; financial support of voca-

tional programs; and the relation between education programs conducted by industry and vocational programs in the schools.

The study indicates that some committees are extremely effective in these spheres, but the number is limited. Where effective, it shows, the committees are composed largely of men actively involved in operations of the industry or trade they represent. These men are involved closely and early in curriculum planning, and their role as lay advisers is both understood and welcomed by professional educators. The study finds that these factors are lacking in most communities, but also cites successful efforts which school administrators who wish to improve effectiveness of their own advisory committees may use as prototypes.

4. Wentworth Institute ($500,000) (1966)

Project Director:

H. Russell Beatty, President, Wentworth Institute

550 Huntington Avenue, Boston, Massachusetts 02115

Since industrial development causes engineering technology to become obsolete in a comparatively short time, there is a compelling need for a curriculum center with a competent staff devoting full time to the continual improvement and updating of engineering technological education.

Wentworth Institute, established in 1904 and widely respected as a model of excellence in the field of technological education, received a Foundation grant to establish and provide for the continuing operation of such a center. The grant is to be matched dollar for dollar by the institute. The center concentrates on continuing research designed to develop new curricula and bring existing curricula up to date. It also serves as a source of information for other vocational education institutions, established and emerging, and as a resource for curriculum information for post-high school technical institutes and community colleges.

1. San Francisco State College (Frederic Burk Foundation for Education) ($450,000) (1965)

Project Director:
George Champion, San Francisco State College
1600 Holloway Avenue, San Francisco, California 94132

The main objective of San Francisco State's effort, supported by a Ford Foundation grant to the Frederic Burk Foundation for Education, is to help other schools in the Bay Area – through workshops and in-service training for teachers – to institute programs similar to those of schools in the pre-engineering and food-technology programs (see pages 7 and 11). Summer workshops are held for about twenty vocational teachers each year; in addition, the college sponsors a symposium for administrators and coordinators and institutes for teachers of vocational and technical education.

The college also provides consultants – drawn from college faculty, industry, and staff of schools in the Richmond Plan – to advise teachers on curriculum and training methods. Consultants also work with high-school staffs in an effort to get them to consider other fields of vocational education – for example, electronics and information programs – in addition to the pretechnology programs.

2. Central Michigan University ($496,000) (1965)

Project Director:
Ernest Minelli, Central Michigan University
Mount Pleasant, Michigan 48858

In cooperation with fourteen public school systems and three community colleges, Central Michigan University has developed a program which uses the coordinated curriculum approach to provide a vocational course which, while flexible, can lead students so inclined to careers as teachers in vocational education.

The program includes a new high-school curriculum beginning in the tenth grade, where students interested in vocational education explore a range of skills and study industry in modern society. Main objective of the tenth-grade curriculum is the discovery and development of technical abilities rather than the preparation of students for specific employment.

During the eleventh and twelfth grades, the program consists of a two-year sequence of courses in English, science, mathematics, and industrial-technical education. As in the pretechnology programs, students entering the labor force out of high school are better prepared for training programs in industry, while those who wish to go to a community college continue in a sequential vocational program based on their high-school work. Students also accumulate enough credits in general college preparatory work to admit them to Central Michigan's general liberal-arts program.

The community-college program is designed to give the student proficiency in his chosen field. It is expected that most of the students will aim at a two-year associate degree, but they will be able to transfer to the university if they wish to continue their education to the bachelor's degree level.

The program for preparation of vocational teachers combines for the first time at a university level the merits of the generalized industrial-arts approach, which is concerned with studies unrelated to particular fields, and specialized vocational education. The program begins with a year devoted to interdepartmental studies, for which instructors from major subject areas will organize the curriculum to emphasize the interrelationships of subjects and their relevance to vocational education. The university has revised its industrial-arts curriculum to provide for special areas of concentration rather than general shop experiences. Each prospective teacher completes a semester of industrial experience related to his area of concentration, plus a ten-week summer session working full time in

industry. Students also spend two semesters of school internships, first as teaching assistants and then as teaching associates under supervision, in high schools that have adopted the new vocational-education program.

3. The Junior College District of St. Louis, Missouri
($500,000) (1966)

Project Director:
Douglas Libby, Jr., The Junior College District of St. Louis
7508 Forsyth Boulevard, Clayton, Missouri 63105

Southern Illinois University, in nearby Carbondale, is cooperating with the Junior College District in a four-year program designed to prepare academic and technical teachers for two-year programs at junior colleges, community colleges, technical institutes, and similar institutions.

Teachers for both academic and technical subjects receive training in a two-year graduate program (including the intervening summer) leading to a master's degree awarded by Southern Illinois. The first year of study includes practical experience as a laboratory or teaching assistant at Southern Illinois' own two-year technical institute. The second year is spent at St. Louis Junior College serving a paid internship and attending seminars and other courses. Instruction and supervision during the second year is handled by teachers holding joint appointments at both the Junior College and the university. A total of eighty teachers will be prepared, with twenty candidates entering this program each year.

In an effort to meet the short-range needs for teachers, a training program is being offered concurrently by St. Louis Junior College for ten prospective teachers of technical subjects recruited from industry. To qualify, the candidates must be technical specialists with baccalaureate degrees and extensive industrial experience. They are

being trained in a program involving an internship, field experience, course work, and seminars.

4. Mississippi State University **($103,000)** **(1966)**
($555,600) **(1967)**

Project Director:
Dean W. C. Flewellen, College of Business and Industry
Mississippi State University, State College, Mississippi 39762

Mississippi State University is coordinating the efforts of the state's seventeen community colleges in their attempt to create a pool of skilled manpower necessary to attract new industry and thus provide jobs. Each of the community colleges serves an area of one to six counties and is accessible to students by free bus service, and tuition is free or minimal.

As a first step, an integrated professional staff working with an advisory committee of leading educators in the state are developing programs for retraining present, and preparing new, vocational-technical teachers for the community colleges. The project includes workshops and in-service training, faculty exchange with the university, and development of new degree programs at the university to prepare future teachers in the field. It also provides for planning long-range programs to strengthen vocational-technical courses in the community colleges, development of admission standards geared to special needs of educationally deprived students, and establishment of supporting programs in the high schools.

Cooperative Work-Study Education

Cooperative work-study education enables students to alternate periods of regular academic studies with off-campus employment related to their field of academic interest and to the careers they expect to follow. In addition to the advantage of interrelating education and

the world of work, such programs sometimes enable low-income students to finance their advanced education.

Until recently, the cooperative system was confined largely to liberal arts and engineering colleges. In 1965 the Fund for the Advancement of Education made seven grants (noted in the following text by the mark †) for experimental programs of work-study preparation for business and industry in junior colleges as well as four-year colleges. It was found in the experiments financed by the Fund that such programs are particularly effective in extending educational opportunities for Negroes.

In an effort to increase the number of cooperative programs available to minority groups, the Foundation in 1966 and 1967 made a further series of grants for work-study programs in urban colleges, predominantly Negro colleges, and publicly supported junior colleges, and for technical aid to the new programs.

National Commission for Cooperative Education
($195,000) (1966)

The commission was established in 1962 to implement recommendations of a study (supported by the Fund for the Advancement of Education) which called for a substantial expansion of cooperative education. The commission acts as a clearinghouse for information about cooperative work-study education throughout the country. Under this grant, the institutions initiating work-study programs with Foundation assistance will turn to the commission for help in mounting their programs, and in training coordinators for them.

Northeastern University **($143,000)† (1965)**
($375,000) (1967)

Northeastern, which offers the largest cooperative education program in the country (all of its 8,000 students participate), received a grant from the Fund to coordinate and assist the work-study experiments

financed by the Fund. Northeastern's staff were assigned to advise on such matters as the field of study in which cooperative programs should be offered, and whether these should be elective or compulsory. Advisers also helped strengthen curricula, and suggested training programs. In addition, Northeastern brought staff members from the colleges to its campus for consultation internships, to see how Northeastern administers its cooperative programs.

To further strengthen and make more permanent its advisory role in cooperative education generally, Northeastern will use its second grant to help establish the nation's first endowed chair in cooperative education. The funds will be matched by other sources, to provide a tenure position for an industrialist or scholar-teacher (from sociology, psychology, or education) who will act as research director, consultant, and curriculum adviser in work-study programs.

Alabama Agricultural and Mechanical College
($57,400) (1965)†

A work-study program in electronics and mechanical technology is conducted for some fifty students, in cooperation with Federal agencies and private industry engaged in space research in the Huntsville area. Special provision is made for changing curriculum to match new developments in this rapidly evolving field.

Bloomfield College ($51,900) (1967)

A private four-year liberal arts school, Bloomfield plans to introduce cooperative work-study as part of a new effort to improve its service to students from the Newark metropolitan area and the rest of heavily urbanized northern New Jersey. Both at its 1,200-student campus at Bloomfield, and at a planned new campus for 3,000 in Parsippany, the college will center curricula around work-study programs for both resident and commuter students, with special emphasis on opportunities for culturally and economically disadvantaged students, and on

continued education for graduates of public two-year colleges and technical schools.

Detroit Institute of Technology **($67,600)** **(1967)**

The institute is a downtown school that enrolls 2,500 men and women from the metropolitan area. Like Bloomfield, it seeks to expand opportunities for its urban constituency by shifting all of its programs – first in business administration and engineering, later in arts and sciences – to a cooperative work-study basis.

Golden Gate College **($60,000)†** **(1965)**
($46,700) **(1967)**

The school plans a program to enable graduates of two-year public colleges and institutes in San Francisco whose program did not contemplate further formal studies – a "terminal" curriculum – to pursue bachelor's degrees in arts or science. Initially some thirty a year will alternate semesters of work and study until the degree is earned. Special efforts will be made to recruit disadvantaged students. Since 1965, Golden Gate has conducted, with a Fund grant, a work-study program for disadvantaged high school graduates, leading to the associate degree in business administration. Some twenty a year attend classes in spring and fall trimesters, spend the summer working and in remedial studies where needed.

Hampton Institute **($60,000)** **(1965)†**

The school conducts a program in industrial technology, in cooperation with several major corporations, to train students for supervisory posts. After two years in a general-education program with a technological emphasis, students work six months in industry under engineers and supervisors experienced in industrial training, and return to the institute to complete work on their degrees, attending one summer session to make up for their time in industry.

29 **New York Institute of Technology ($67,500) (1965)†**

The institute, a private post-secondary vocational school, is testing a program in electrical and computer technology in which students pursue the bulk of their studies off campus, using programmed instruction material developed by the institute staff in cooperation with local industry. Full-time attendance at the institute is required for only a few weeks in the year.

Rutgers University ($67,800) (1967)

Rutgers plans a pilot program using the work-study concept as an alternate to conventional methods of training vocational teachers. Vocational teachers traditionally require at least six years' experience in an occupation or trade before starting college course work in education. The new program will seek to reduce the time required. Recent graduates (and some selected non-graduates) of high school vocational and industrial arts programs – at least half of them disadvantaged Negroes – will acquire 5,000 hours of supervised on-the-job experience concurrently with sixty semester hours of afternoon and evening course work in education at Rutgers' University College division in a three-year period, and spend a fourth year in full-time studies. The course leads to a bachelor of science degree and certification as an instructor in vocational education.

San Mateo Junior College District ($60,000) (1967)

The college will initiate a cooperative industry-education program in the fast-growing San Mateo County area just south of San Francisco, where opportunities in the fields of aviation, electronics, and wholesale distribution are rapidly expanding. In addition to the conventional pattern which alternates full study and work, the college plans an arrangement to afford credit for daytime employment for evening

students. About 25 per cent of the 8,000 day and 13,000 evening students are expected ultimately to participate.

Voorhees Technical Institute ($47,000) (1967)

The college, formerly the New York Trade School, has since 1961 operated as a two-year school granting the Associate in Applied Science Degree. It plans to explore a variation of work-study in which students are alternately employed for a term and subsidized by a corporation in technical course work for a term. It also plans to explore with building trades unions the feasibility of using work-study arrangements as an alternative to conventional apprenticeship programs.

Water and Sewerage Technical School ($57,000) (1965)†

Also a private vocational school, W & S conducts a cooperative study program with public and private utilities in the increasingly complex field of water supply and sewerage disposal. The utilities – which have the large and expensive equipment schools cannot generally afford – give practical training, while the school provides the academic content.

Wilberforce University ($52,200)† (1965)
($45,300) (1967)

A predominantly Negro institution near Dayton, Ohio, Wilberforce plans to make cooperative education a requirement for all students. Like Golden Gate, the school has conducted an experimental program, aided by a Fund grant. It placed students in jobs with nonprofit social service agencies, with salary support from Office of Economic Opportunity funds. An enrollment increase from 415 to 800 is attributed by the college largely to the success of this program. Now Wilberforce seeks to develop similar cooperative work-study opportunities in private business and industry; and to augment orien-

tation, counseling, and coordination services to serve the larger number of students.

Further information on these projects may be obtained from:

George E. Probst, National Commission for Cooperative Education, 8 West 40th Street, New York, New York 10018

Asa S. Knowles, President, Northeastern University, Boston, Massachusetts 02115

W. H. Hollins, Alabama Agricultural and Mechnical College, Normal, Alabama 35762

Theodore A. Rath, President, Bloomfield College, Bloomfield, New Jersey 07003

Dewey F. Barich, President, Detroit Institute of Technology, 2300 Park Avenue, Detroit, Michigan 48201

Russell T. Sharpe, Golden Gate College, 220 Golden Gate Avenue, San Francisco, California 94102

James R. Russell, Jr., Hampton Institute, Hampton, Virginia 23368

Bertram Spector, New York Institute of Technology, Syosset Extension, 175 Jericho Turnpike, Syosset, New York 17791

Carl J. Schaefer, Rutgers University, New Brunswick, New Jersey 08903

Robert L. Bennett, San Mateo Junior High School District, 650 N. Delaware Street, San Mateo, California 94402

Dr. Edwin H. Miner, President, Voorhees Technical Institute, 450 West 41st Street, New York, New York 10036

Lloyd Caughran, Water and Sewerage Technical School, Box 348, Neosho, Missouri 64850

James R. Davis, Wilberforce University, Wilberforce, Ohio 45384

The following is a selected list of publications available without charge from the Ford Foundation, Office of Reports, 477 Madison Avenue, New York, N.Y. 10022. A complete list of publications is also available.

The Ford Foundation Annual Report

About the Ford Foundation: General description of the Foundation's programs and objectives.

Action for Equal Opportunity: by McGeorge Bundy, president of the Foundation, from an address to the National Urban League in Philadelphia, August 2, 1966.

American Community Development: Preliminary reports on comprehensive community projects assisted by the Foundation in Boston, New Haven, Oakland, Philadelphia, and the state of North Carolina.

Cross Section: Foundation programs illustrated by activities in a single city (Pittsburgh).

Making Education Relevant: by Marvin Feldman, from a paper prepared for the Governor's Conference on Education, State of New Jersey, Rutgers University, April 2, 1966.

Prospecting in Economics: Foundation grants in economic research.

Public Education and Manpower Development: by Marvin Feldman, adapted from an address given at the Conference on Curriculum and Teaching in Depressed Areas, Columbia University, June 27, 1967.

The Society of the Streets: Activities in youth development and delinquency prevention and treatment.

Technical Education in the Developing Countries: by K. N. Rao, from an address at the Annual Convention of the American Vocational Association in Miami Beach, Florida, December 10, 1965.

Urban Extension: A report on experimental programs assisted by the Foundation.

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